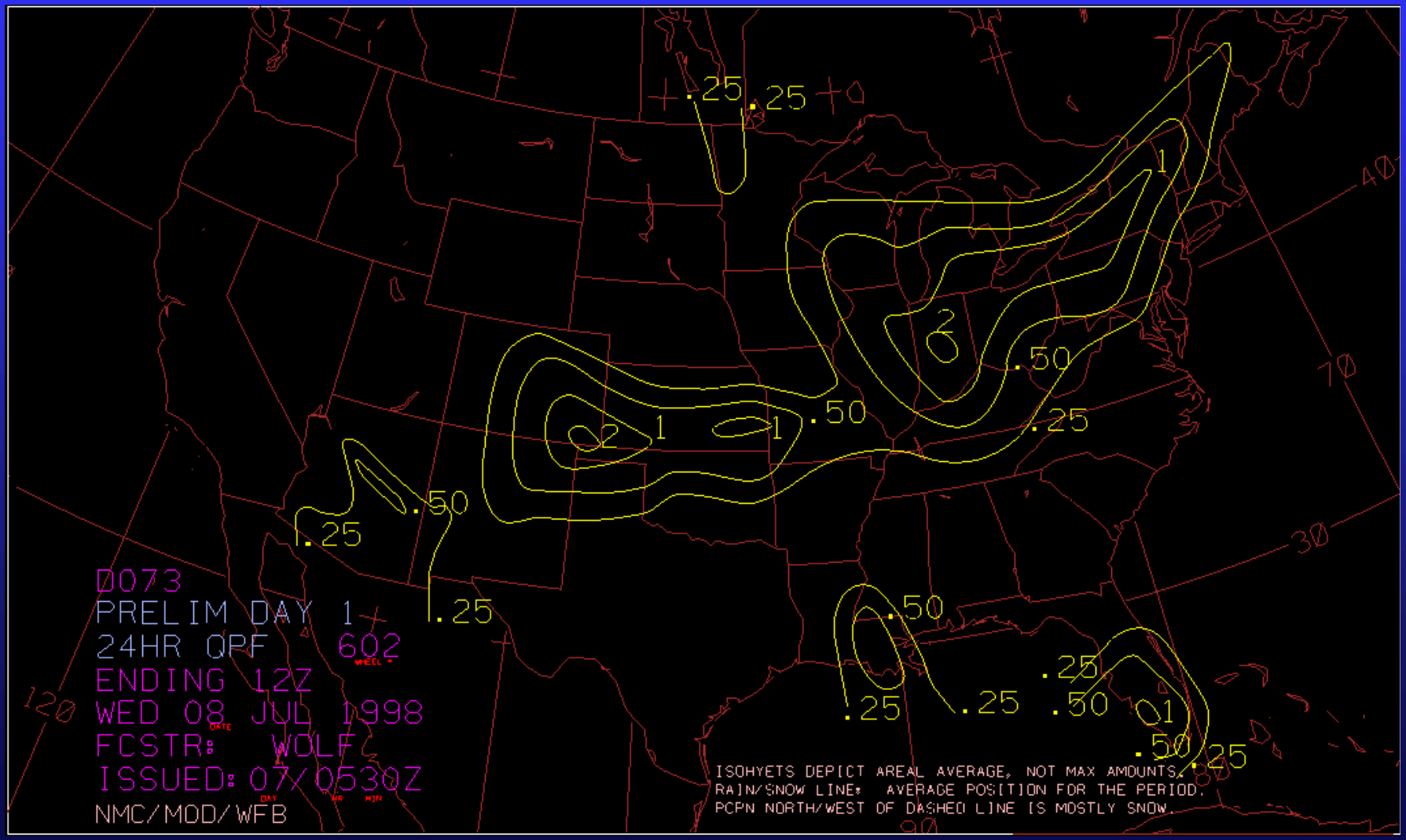
QPF PRODUCTS/VERIFICATION

QPF PRODUCTS: 24-HR QPF

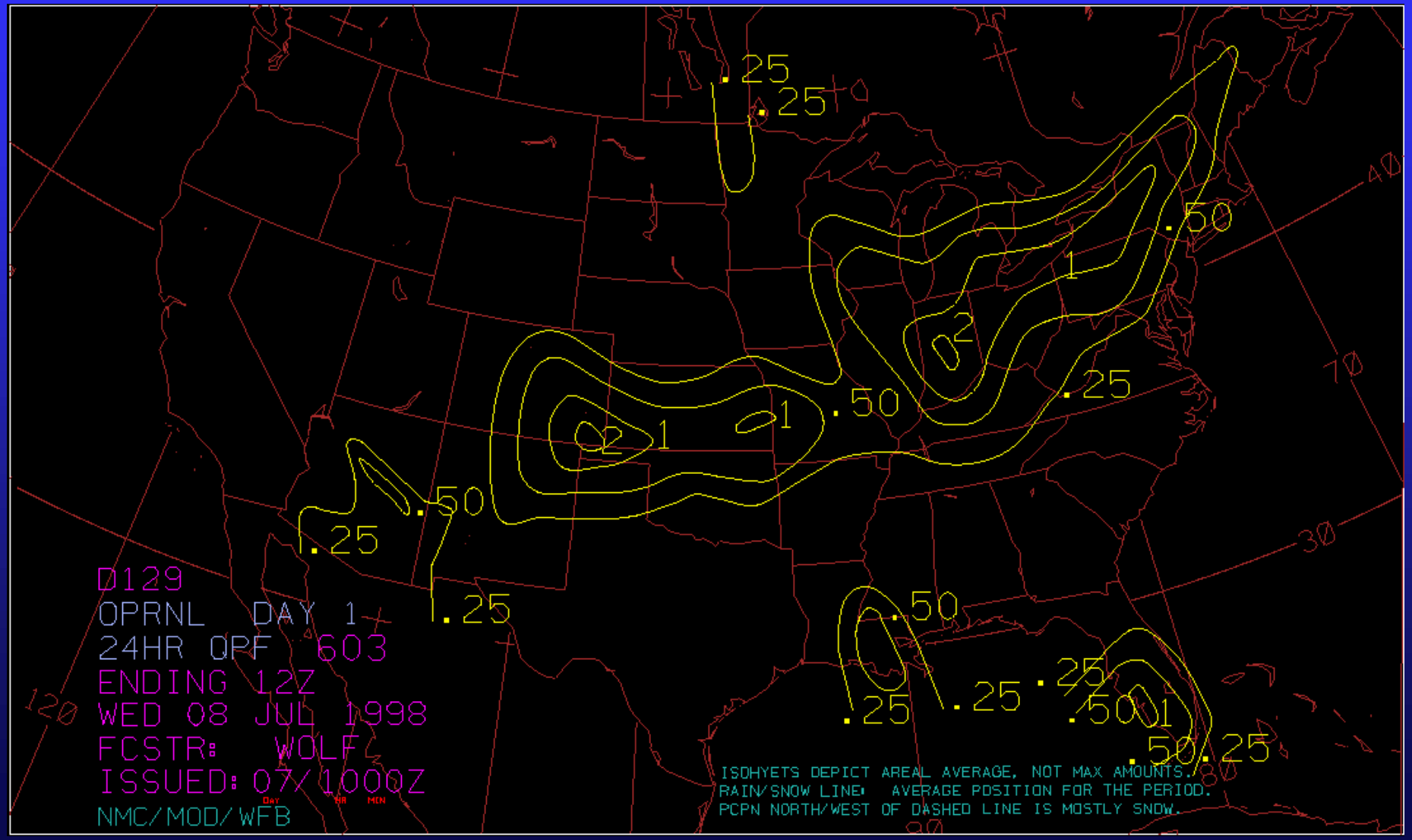
- 24-hour QPF
  Purpose: To provide the expected distribution of areal precipitation for a given 24-hour period.

- Products
  --12-36 hour prelim day 1 (94Q), issued at 06Z
  --36-60 hour day 2 (98Q), issued at 10Z
  --12-36 hour final day 1 (94Q), issued at 10Z
  --24-48 hour update (98Q), issued at 18Z
  --Accompanying narratives (QPFPFD)

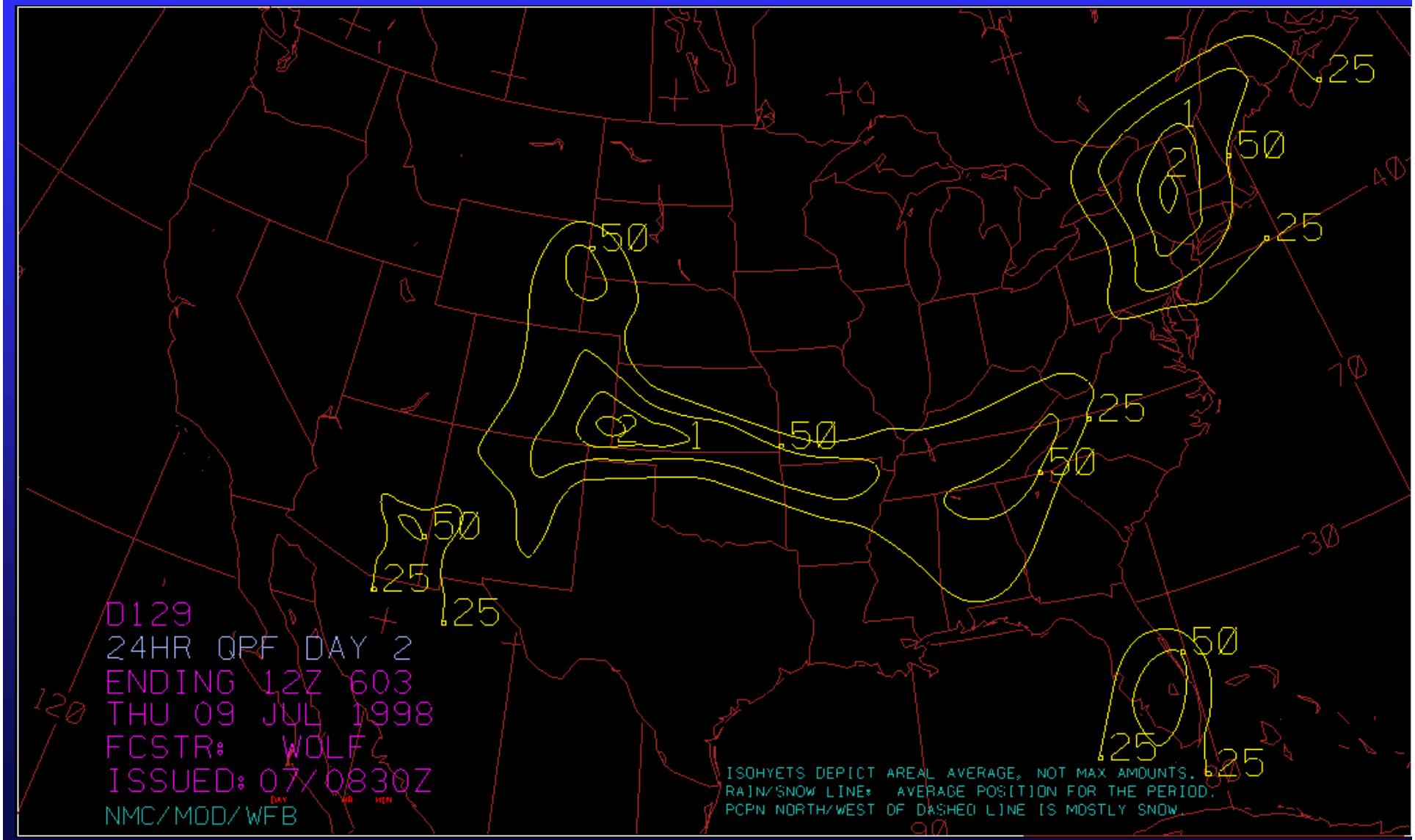
PRELIM 24-HR DAY 1 FORECAST



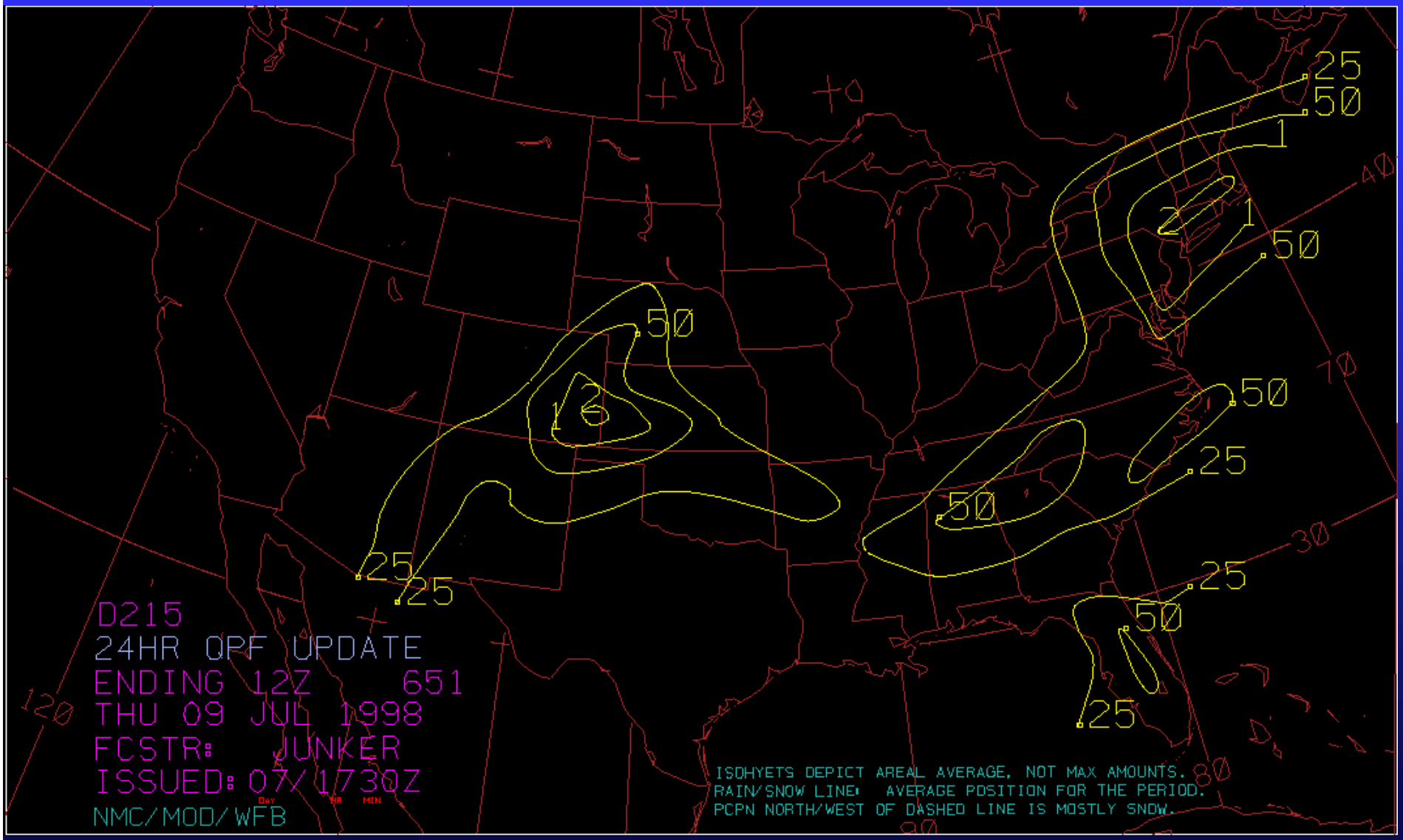
OPERATIONAL 24-HR DAY 1 FORECAST



24-HR DAY 2 FORECAST



UPDATE 24-HR DAY 2 FORECAST



VERIFICATION: 24-HR QPF

- Areal verification: Objective analysis east of 105W with a 30km grid (implemented in 1984)
- Final analysis includes manual quality control to remove erroneous precipitation data and to improve analysis over data-sparse regions
- Final analysis is modified before being entered into workstation; derived statistical measures are then computed
- Manual QPF is verified against model QPF (ETA, NGM, AVN)

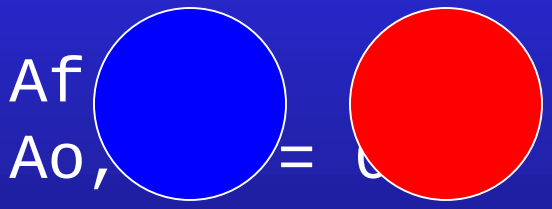
THREAT SCORE

$$TS = Ac / (Af + Ao - Ac)$$

Ac = Area correct

Af = Area forecast

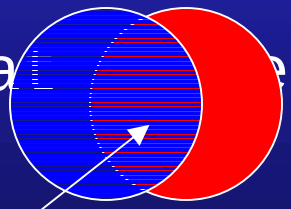
Ao = Area observed



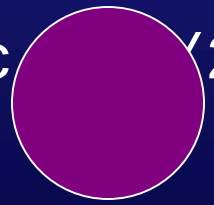
Af

Ao, = 0

Ao



Threa e = 0.00



Af

Ao, Ac Y2 Af

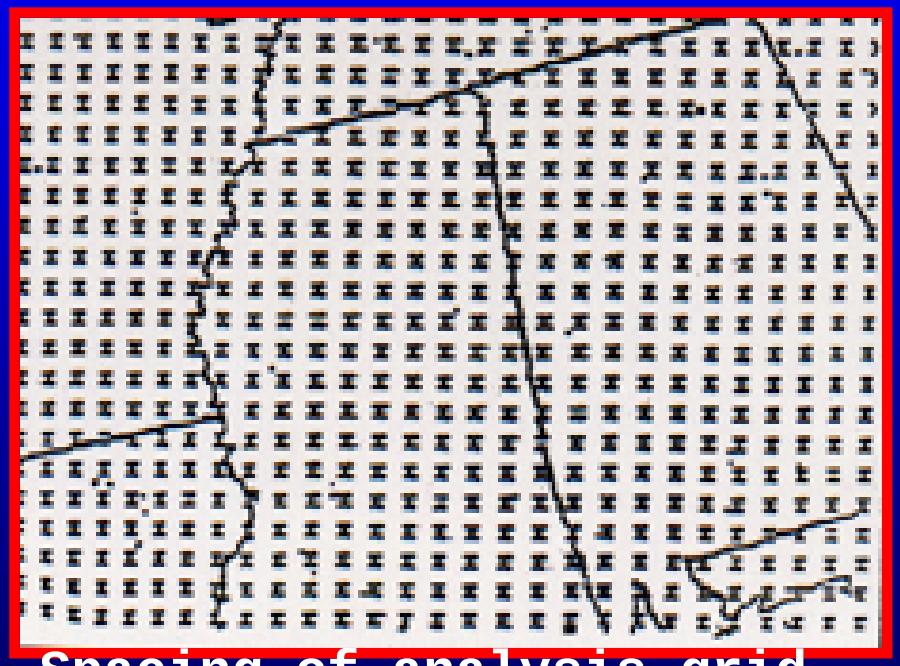
Ao

Threat score =

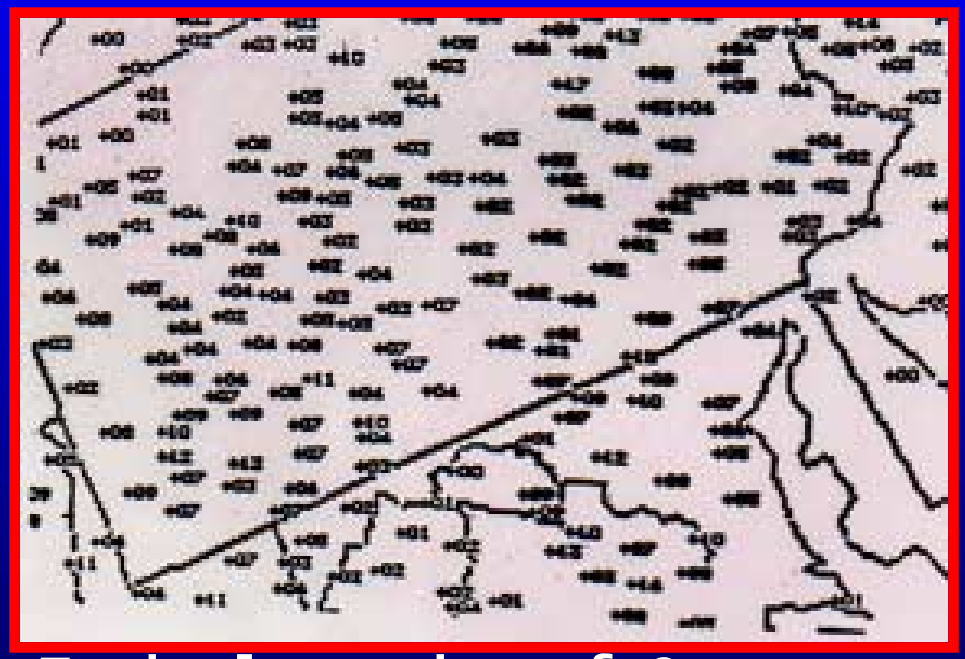
Ac

24 HOUR VERIFICATION

l verification but not a basin verification of basi



Spacing of analysis grid for 24-hr verification. The analysis grid may change in the next year or two



Typical spacing of Co-operative observer network for most of eastern two thirds of the country

A rough hand analysis is used to initially QC data. Then an automated analysis is made and this new analysis is checked to make sure it has picked up all the data. A final analysis is then entered into a workstation to be used for verification.

Automated analysis **Final analysis**

We have finally started verifying subjective and ETA model threat scores

12-36 hr forecasts for .50” or more

- 22.9 for Subjective forecast
- 16.7 for ETA model
- 15.9 for RAFS model
- 15.3 for the MRF/AVN

We’ve only been scoring versus the ETA for about a month

The 24 hr subjective guidance usually scores better than the models

- This is especially true when convection is involved
- is usually the case for tropical systems
- and for heavier precipitation amounts
- our bias for .50 and 1.00” is usually around 1.2

QPF PRODUCTS: 6-HR QPF

- 6-hr QPF purpose
  (1) To provide QPF data to hydrologists as a tool for predicting river stages and flows while augmenting the excessive rainfall potential outlook
  (2) To enhance the usefulness of the 24-hr QPF by providing an update based on later model guidance

- Products
  -- 00-06 hr (91E)
  -- 06-12 hr (92E)
  -- 12-18 hr (93E)

  91E, 92E and 93E are issued 4 times a day: 03Z, 06Z, 14Z, 18Z

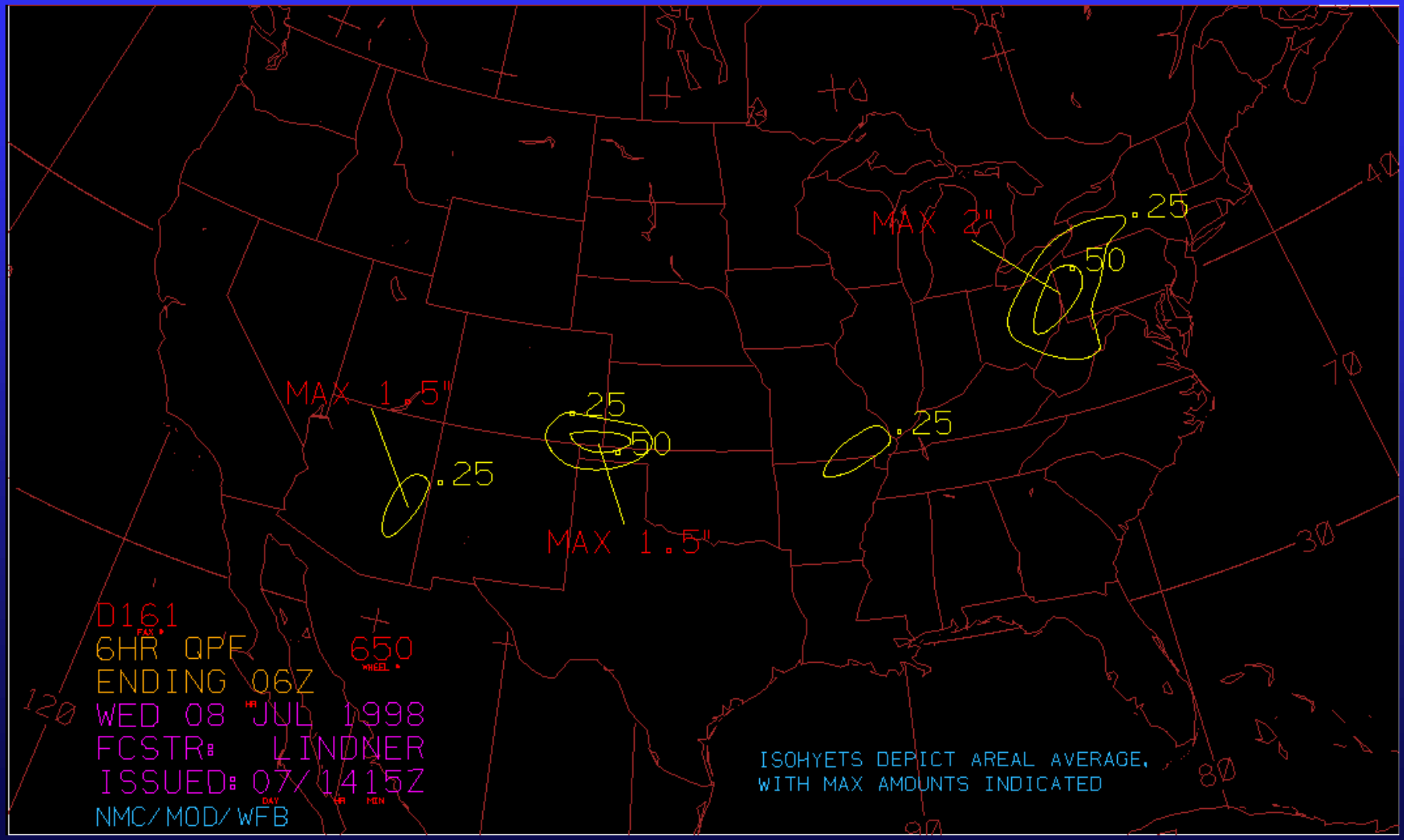
  (92E and 93E from 06Z are updated at 10Z)

  -- 18-24 hr (9EE)
  -- 24-30 hr (9FE)

  9EE and 9FE are issued at 10Z and 18Z

- Coordination calls: (301) 763-8301

6 HOUR FORECAST



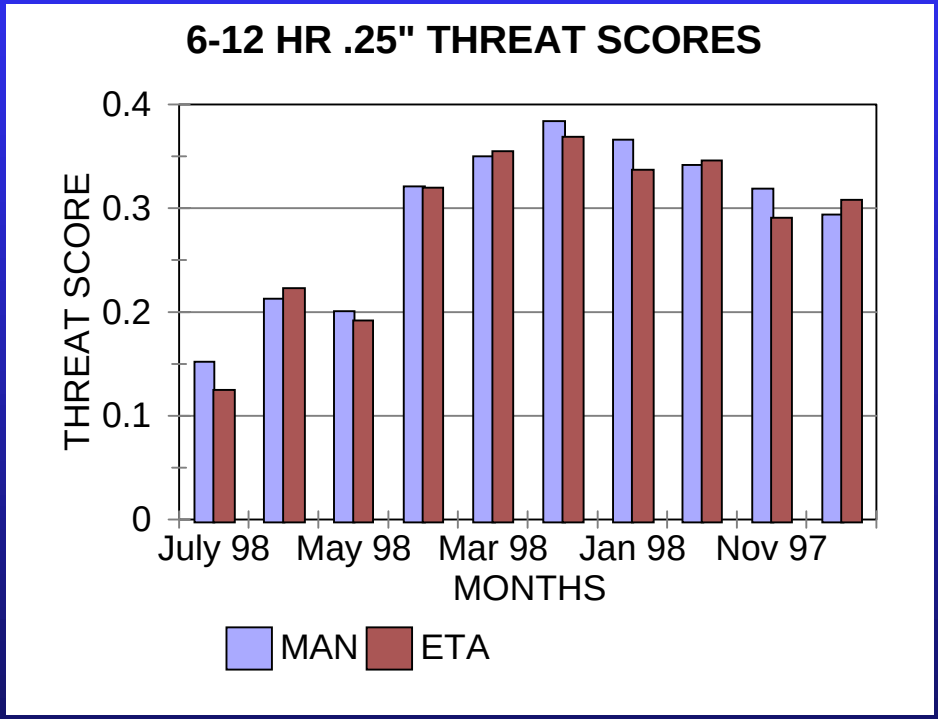
VERIFICATION: 6-HR QPF

- Point-verified using a network of about 400 stations
- Threat scores and biases are computed for each forecaster. This procedure became automated in 1992, but needs work (it tends to rob forecasters of correct hits)
- Goal is to implement an areal verification scheme similar to the 24-hr QPF
- Manual 6-hr QPF has just begun to be verified against the models
- 6-hr QPF is by far the toughest job in terms of verification, especially during the warm season due to the nature of convection and the precise timing required

Cumulative .25” (or more) threat scores for all 6-hour forecasts no matter what the lead time

- Subjective forecast had a .301 threat score and 1.19 bias
- Eta forecasts had a .205 threat score and a .795 bias
- most of the man’s advantage however is in the 0-6 hr time range

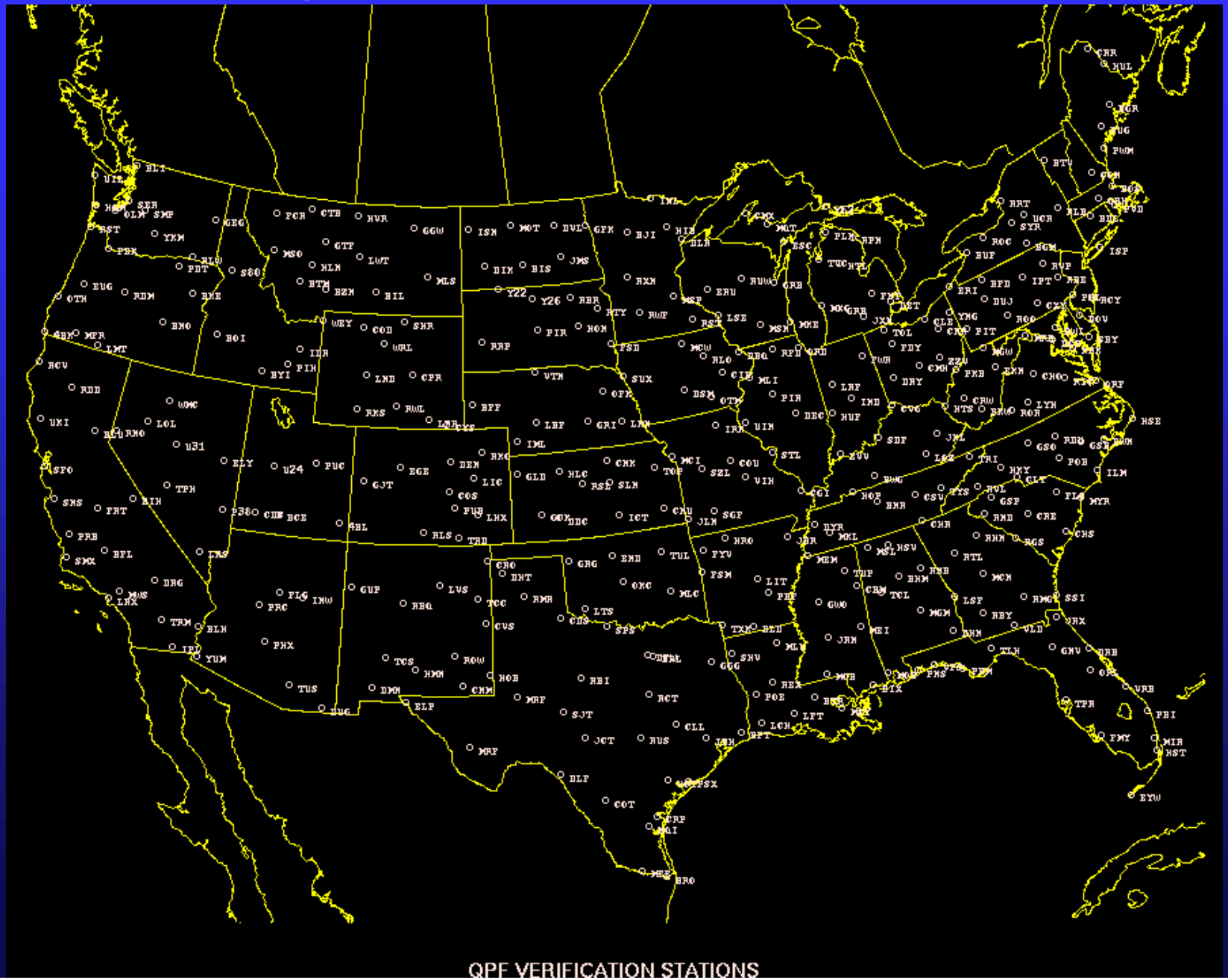
Over the course of the year, the subjective 6 hourly threat scores average higher than the eta forecasts, especially in the 0-6 hr forecasts.



However, the advantage is not very large in the longer time ranges.

Because timing exactly when an MCS or rain band will produce .25 over any single point is extremely difficult.

6-HR QPF VERIFICATION STATIONS



6 hourly forecasts

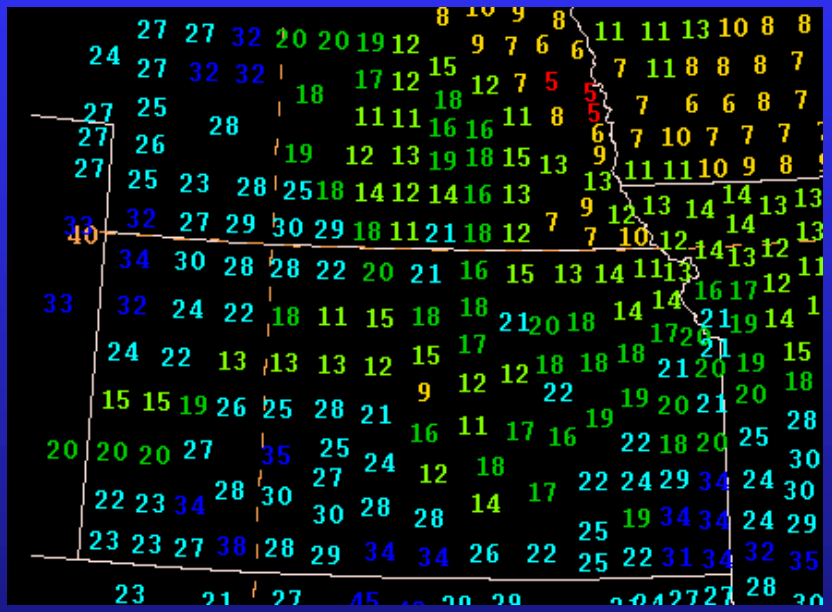
- The lack of data in the current verification scheme makes it possible for convective systems to fall through the cracks
- forecasters, especially new ones expand their areas and almost always end up with a high bias.
- Threat scores decrease as lead times increase.

QPF PRODUCTS:
EXCESSIVE RAINFALL POTENTIAL OUTLOOK

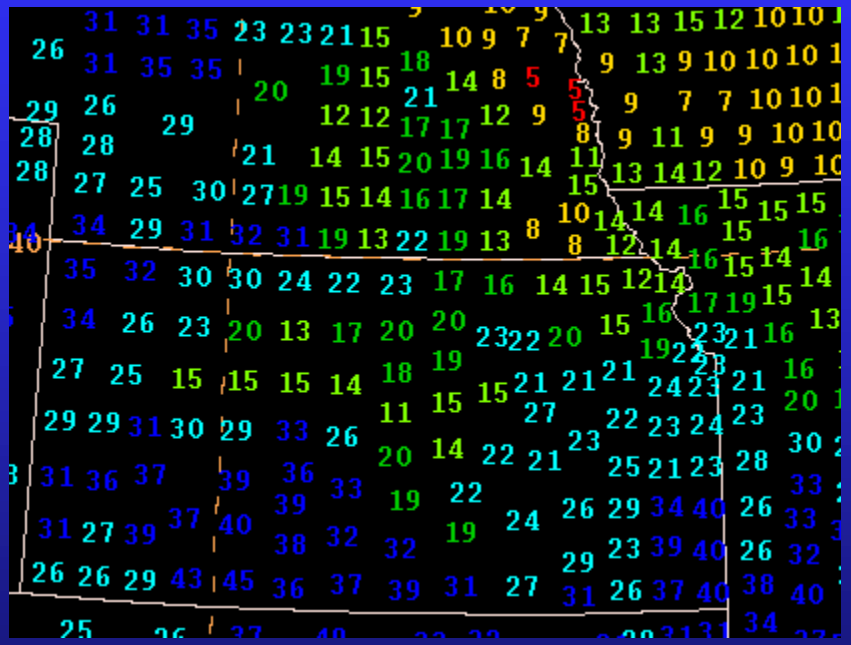
- **Excessive rainfall potential outlook**
  Purpose: To alert NWS field offices to the potential for flash flooding due to the expected occurrence of excessive rainfall (analogous to the convective outlook issued by SPC)

- **Products:**
  -- 24-hr (94E), issued at 06Z
  These forecasts cover the period
  -- 21-hr (94E), issued at 14Z
  through 12Z on the next day
  -- 15-hr (94E), issued at 18Z
  -- 09-hr (94E), issued at 03Z if required
  -- Accompanying narratives (QPFERD)

FLASH FLOOD GUIDANCE



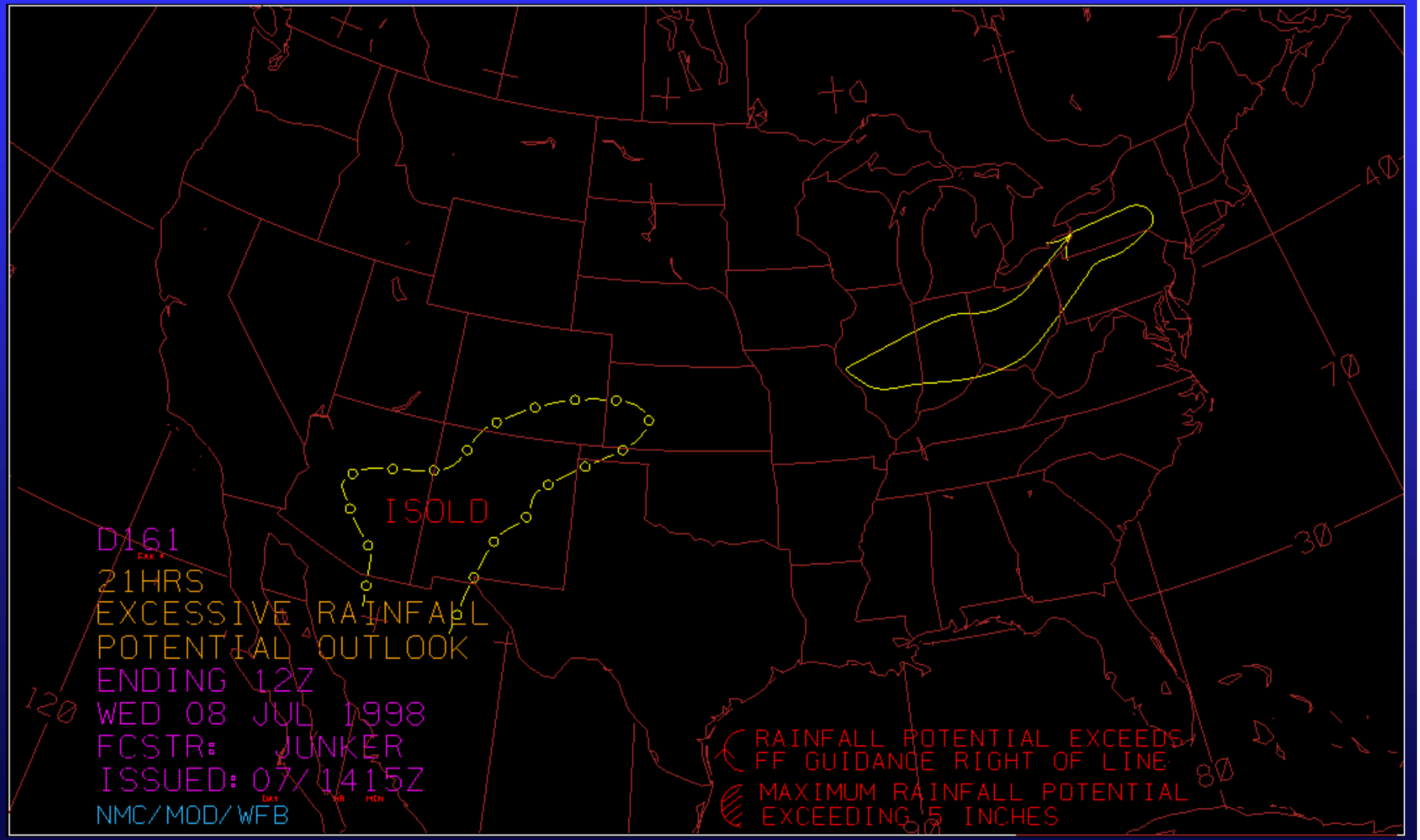
1-HR



3-HR

When rainfall is expected to exceed these values (shown here in tenths of an inch), HPC will issue an excessive rainfall potential outlook (94E).

EXCESSIVE RAINFALL POTENTIAL OUTLOOK



THE HYDROMETERICAL PREDICTION CENTER

- EXISTS TO SERVE YOU
- WE ENCOURAGE CALL IF YOU HAVE ANY QUESTIONS ABOUT
  - MODELS
  - OUR FORECASTS
  - OUR PHONE NUMBERS ARE
    - (301)-763-8201 OR (301)-763-8146